Amendments to Claims

This listing of claims will replace all prior versions, and listings, of claims inthe application:

Listing of Claims:

Claims 1-26 (canceled)

Claim 27. (currently amended) An isolated polynucleotide comprising:

(a) a nucleotide sequence encoding a polypeptide having Δ^4-16:0-ACP desaturase activity, wherein the amino acid sequence of the polypeptide and the amino acid sequence of SEQ ID NO:2 have at least ~~75%~~ 90% sequence identity based on the Clustal alignment method, or

b) the complement of the nucleotide sequence of (a).

Claims 28-30 (canceled)

31. (previously added) The polynucleotide of Claim 27, wherein the amino acid sequence of the polypeptide and the amino acid sequence of SEQ ID NO:2 have at least 95% sequence identity based on the Clustal alignment method.

32. (previously added) The polynucleotide of Claim 27, wherein the amino acid sequence of the polypeptide comprises the amino acid sequence of SEQ ID NO:2.

33. (previously added) The polynucleotide of Claim 27 wherein the nucleotide sequence comprises the nucleotide sequence of SEQ ID NO:1.

34. (currently amended) An isolated nucleic acid molecule comprising:

(a) at least 300 nucleotides and

(b) said isolated nucleic acid molecule remains hybridized to an isolated polynucleotide comprising:

(i) a nucleotide sequence encoding a polypeptide having Δ4-16:0-ACP desaturase activity, said nucleotide sequence comprising the nucleotide sequence of SEQ ID NO:1, wherein the amino acid sequence of the polypeptide and the amino acid sequence of SEQ ID NO:2 have at least ~~75%~~ 90% sequence identity based on the Clustal alignment method, or

(ii) the complement of the nucleotide sequence of (i), under a wash condition of 0.1X SSC, 0.1% SDS, and 65°C.

35. (previously added) A vector comprising the polynucleotide of Claim 27.

36. (previously added) A chimeric gene comprising the polynucleotide of Claim 27 operably linked to at least one regulatory sequence.

37. (previously added) A method for transforming a cell, comprising transforming a cell with the polynucleotide of Claim 27.

38. (previously added) A cell comprising the chimeric gene of Claim 36.

39. (previously added) A method for producing a plant comprising transforming a plant cell with the polynucleotide of Claim 27 and regenerating a plant from the transformed plant cell.

40. (previously added) A plant comprising the chimeric gene of Claim 36.

41. (previously added) A seed comprising the chimeric gene of Claim 36.

42. (previously added) A method for production of a polypeptide having Δ^4-16:0-ACP desaturase activity comprising the steps of cultivating the cell of Claim 38 under conditions that allow for the synthesis of the polypeptide and isolating the polypeptide from the cultivated cells, from the culture medium, or from both the cultivated cells and the culture medium.

43. (previously added) A method for altering the level of Δ^4-16:0-ACP desaturase expression in a host cell, the method comprising:

(a) transforming a host cell with the chimeric gene of Claim 36; and

(b) growing the transformed cell in step (a) under conditions suitable for the expression of the chimeric gene.

44. (previously added) A method for producing petroselinic acid in a plant, the method comprising:

(a) transforming a plant with a chimeric gene comprising the isolated polynucleotide of Claim 27 or a functionally equivalent subfragment thereof operably linked to at least one suitable regulatory sequence;

(b) growing the transformed plant under conditions suitable for the expression of the chimeric gene; and

(c) selecting those transformed plants producing petroselinic acid.

45. (previously added) A method for producing seed oil containing fatty acids having petroselinic acid in the seeds of plants which comprises:

(a) transforming a plant with a chimeric gene comprising the isolated nucleic acid fragment of Claim 27 or a functionally equivalent

subfragment thereof operably linked to at least one suitable regulatory sequence;

(b) growing a fertile mature plant from the transformed plant cell of

step (a);

(c) screening progeny seeds from the fertile plants of step (b) for altered levels of acetylenic fatty acids; and

(d) processing the progeny seed of step (c) to obtain seed oil containing petroselinic acid.